

ABSTRACT OF THE DISCLOSURE

An information process of various kinds of haptic information such as a temperature, pressure, and the like, which is approximate to human haptic sense, is 5 easily achieved in a wide variety of applications in different fields such as detection of various three-dimensional patterns, the surface states of paper and the like, an input device to an information apparatus, and the like without damaging a device. To 10 this end, a single haptic information element simultaneously handles a plurality of kinds of information, i.e., a temperature and pressure, using a ferroelectric or pyroelectric which responds to both the temperature and pressure. Furthermore, not only 15 these pieces of information are detected, but also some or all pieces of detected information are expressed under the control using an external power supply by forming the ferroelectric or pyroelectric on a hollow space structure, i.e., a cantilever or simple beam. A 20 metal oxide film is divided into a plurality portions, and a plurality of different kinds of information are detected by electrodes formed on the respective portions. Hence, even when one detection element is damaged, the functions of other detection elements can 25 be assured, and the manufacturing process is simplified. Moreover, an information input/output apparatus with these devices is provided.